SCHEDULING BASICS:
Critical Path Method Scheduling

presented for

First Annual NASA Project Management Conference

Meeting the PM Challenge

March 30-31, 2004

College Park, MD

PMA performance management associates, inc.

presented by

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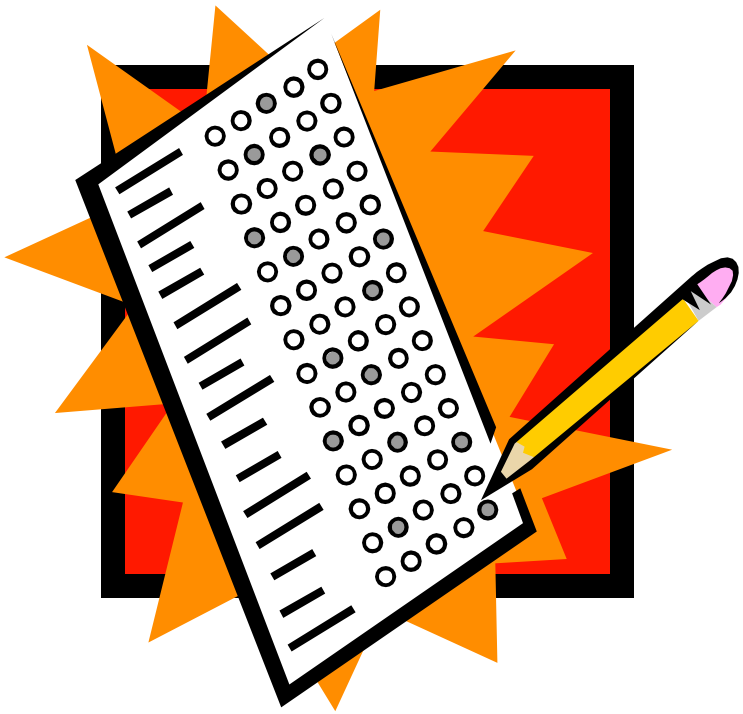
Since This is About Scheduling



We will start with a scheduling awareness quiz!

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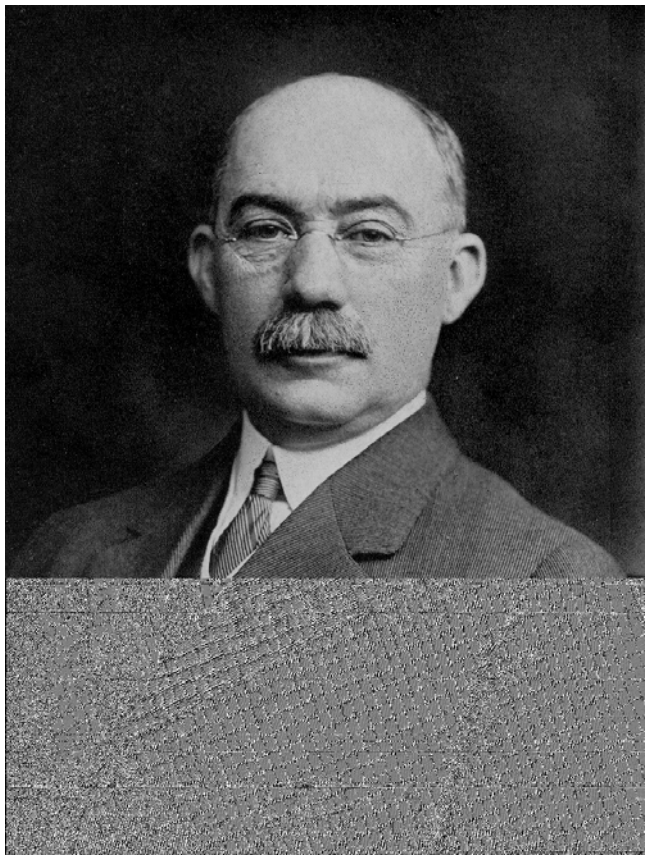
Schedule Awareness Quiz

- *Who's portrait is this?*



Henry Laurence Gantt
May 20, 1861 - November 23, 1919

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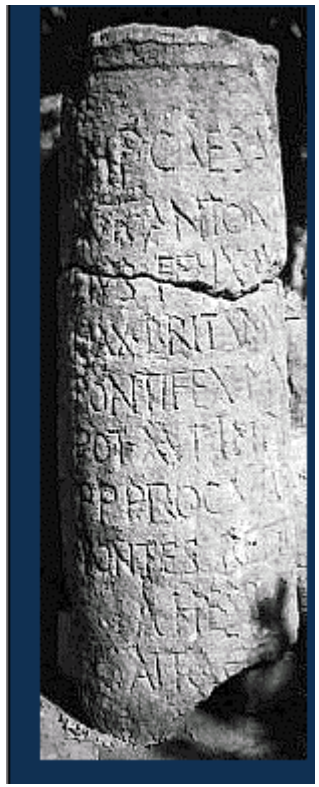
Schedule Awareness Quiz

- *What's this a picture of?*

This is a picture of an ancient Roman street sign which was placed every mile along the highway. It told the traveler how far he had gone and how much farther his destination was. It was commonly known as a "Milestone".



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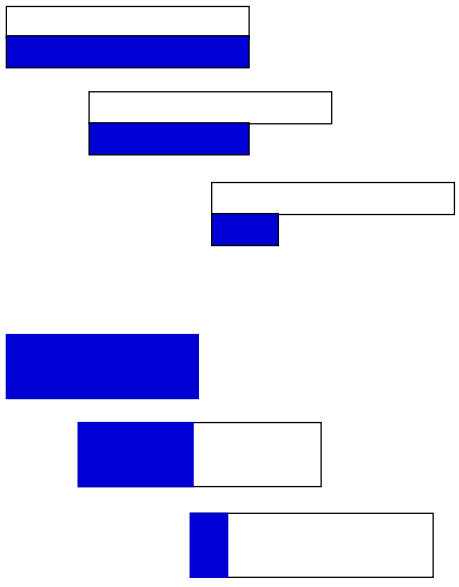
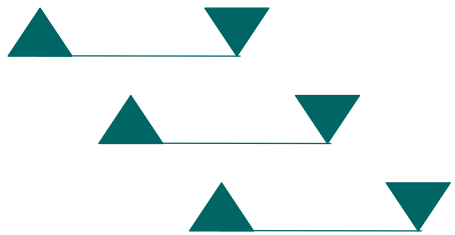
Types Of Schedules

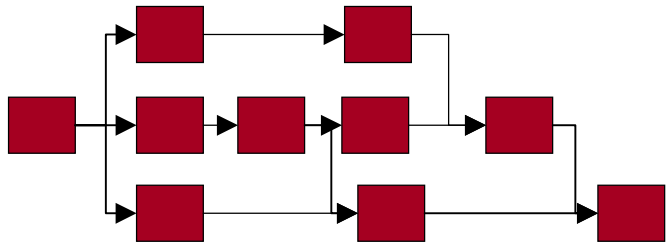
Gantt Or Bar Chart



Milestone Or Event Charts



Logic Diagrams/ Networks



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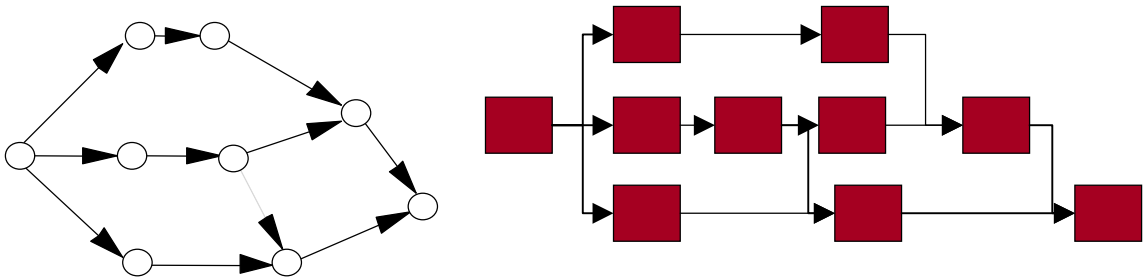
Networks

- Composite refinement of charting techniques
- Stresses logic/interdependencies
- Effective for complex one-of-a-kind projects



- Graphical representation of project showing interrelationships of activities
- When time estimates and computations are added – becomes project schedule

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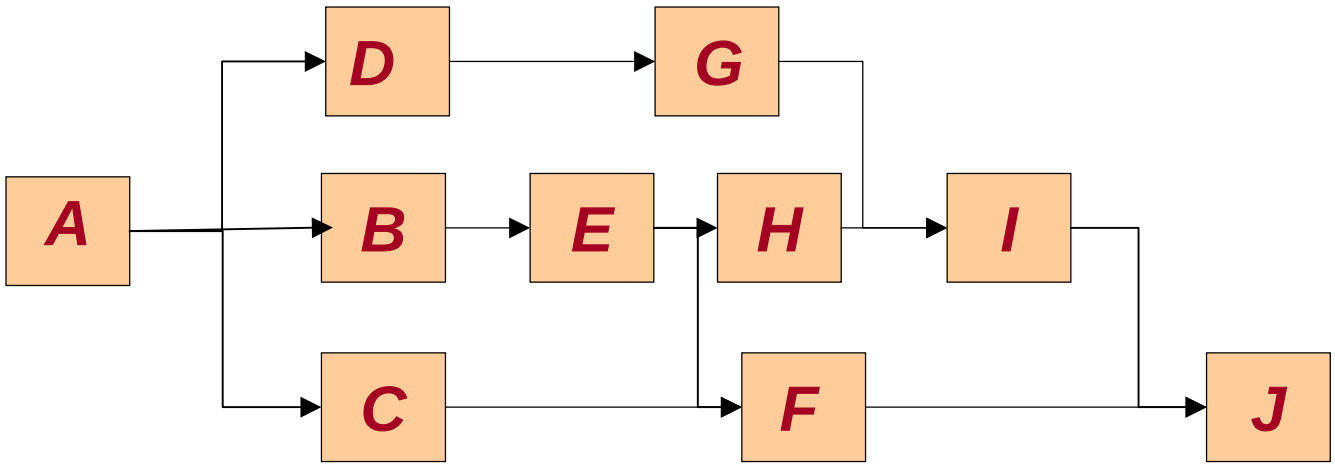
Precedence Diagramming Method (PDM)



- Developed at Stanford University
- Also called “Activity-On-Node”
- More flexibility in showing relationship

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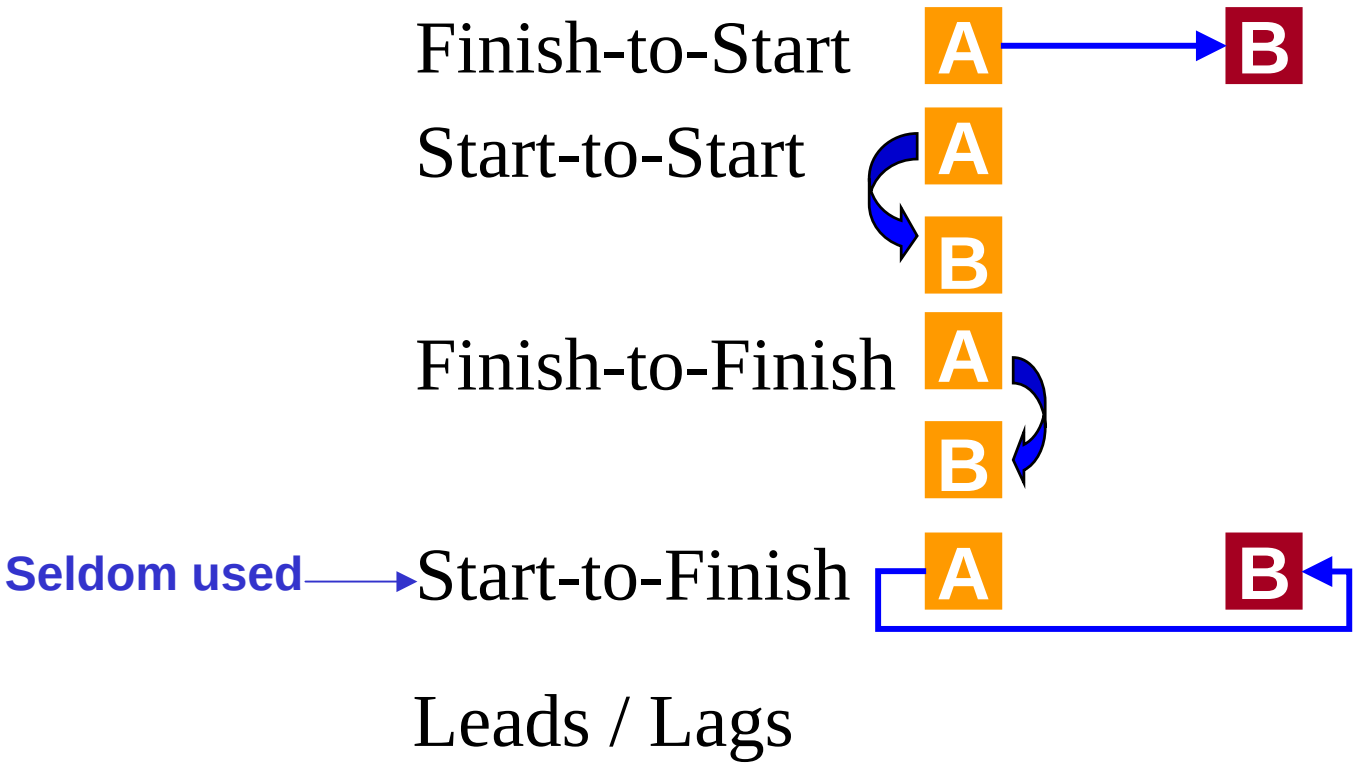
Types of PDM Relationships



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Finish-to-Start

- Activity D can start as soon as A finishes
- Conventional (Default) Relationship

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Lags

- Activity D can start 5 days after A finishes

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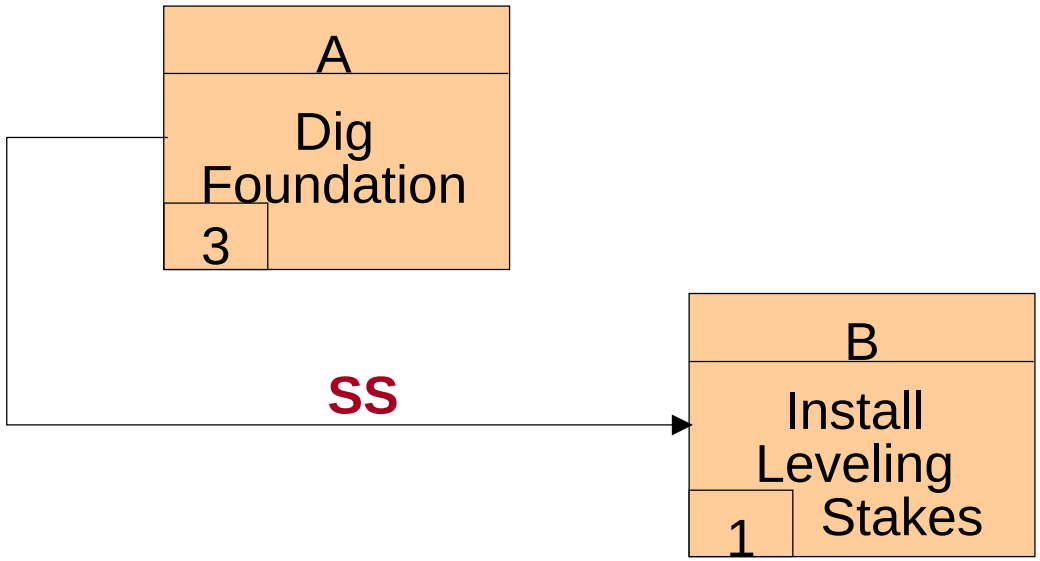
Start-to-Start



- Activity B can start as soon as A starts

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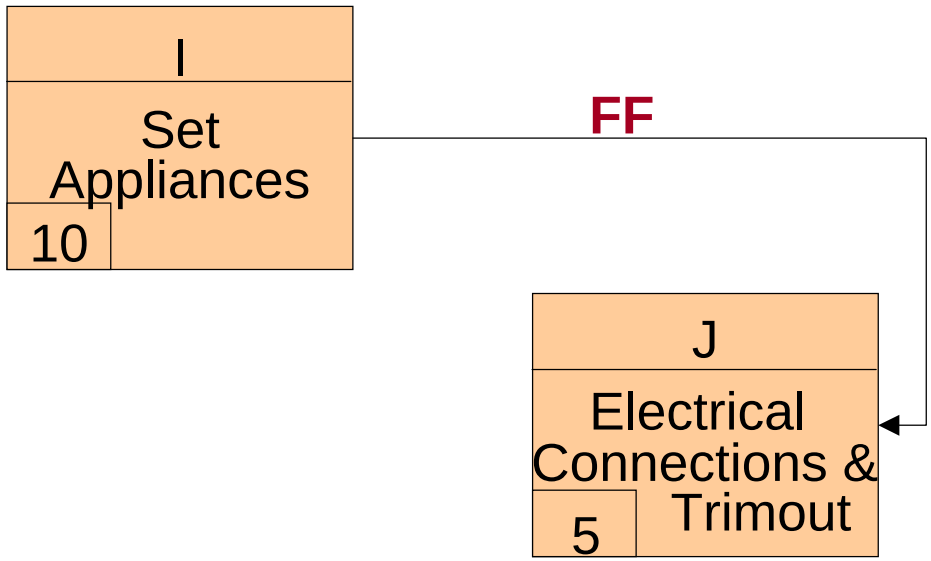
Finish-to-Finish



- J cannot finish until I finishes

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Task Durations (Estimates)

- Developed for each activity
- Developed by best available authority
- Generally assumes normal conditions (manpower, equipment, calendar, etc.)
- CAUTION: - Over-Estimating Tendencies

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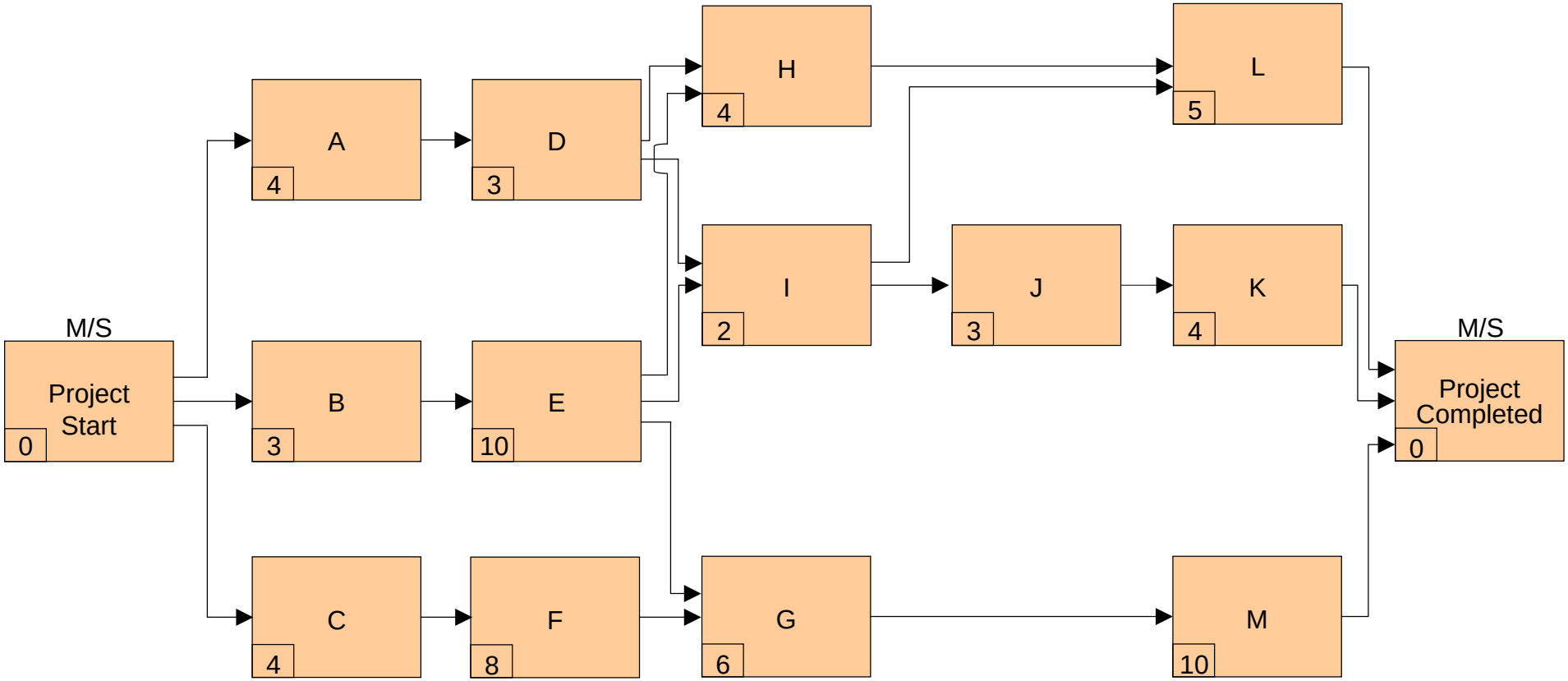
Network A



PROJECT LENGTH?

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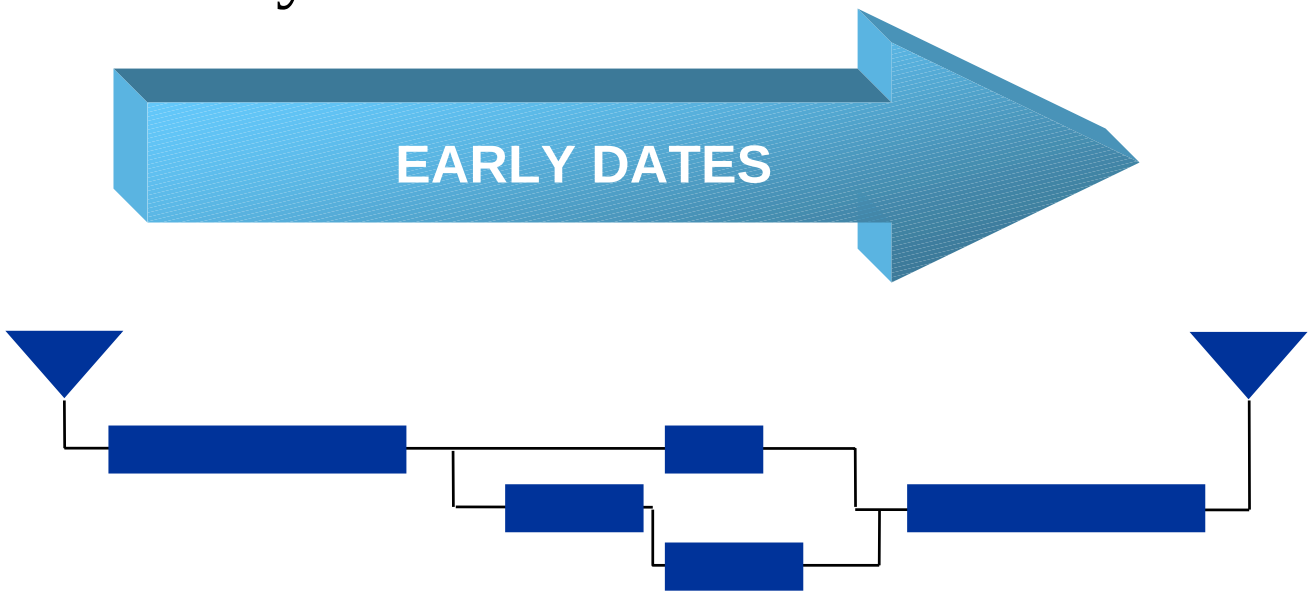
Forward Pass

- From project start to finish, calculate the ***earliest*** that each activity can start and finish according to the logical sequence of work and the duration of each activity



- Yields project duration

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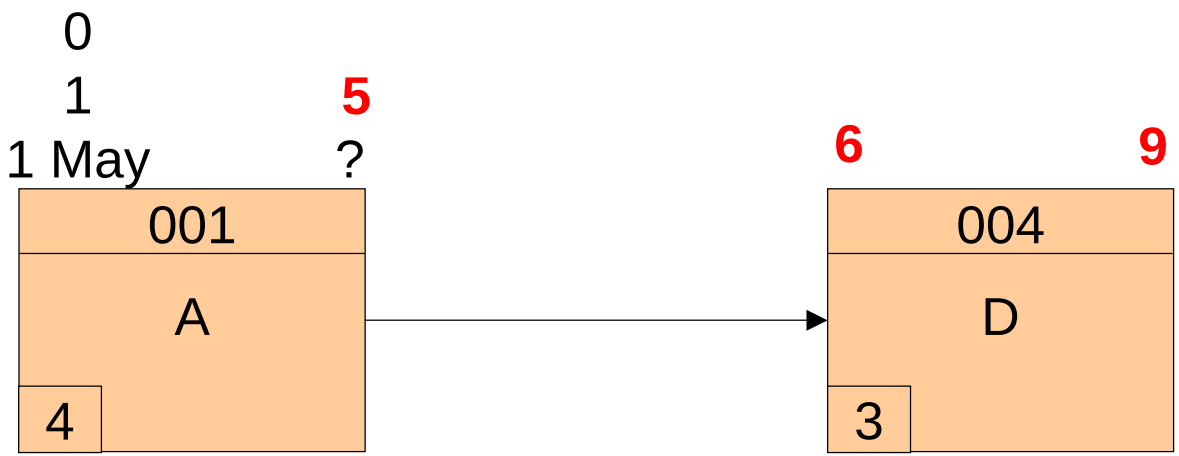

Right?!

WRONG!!

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- ES (Beginning of day)
- EF (End of day)

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- ES + Duration -1 = EF
- ES (next activity) = EF (preceding activity) + 1

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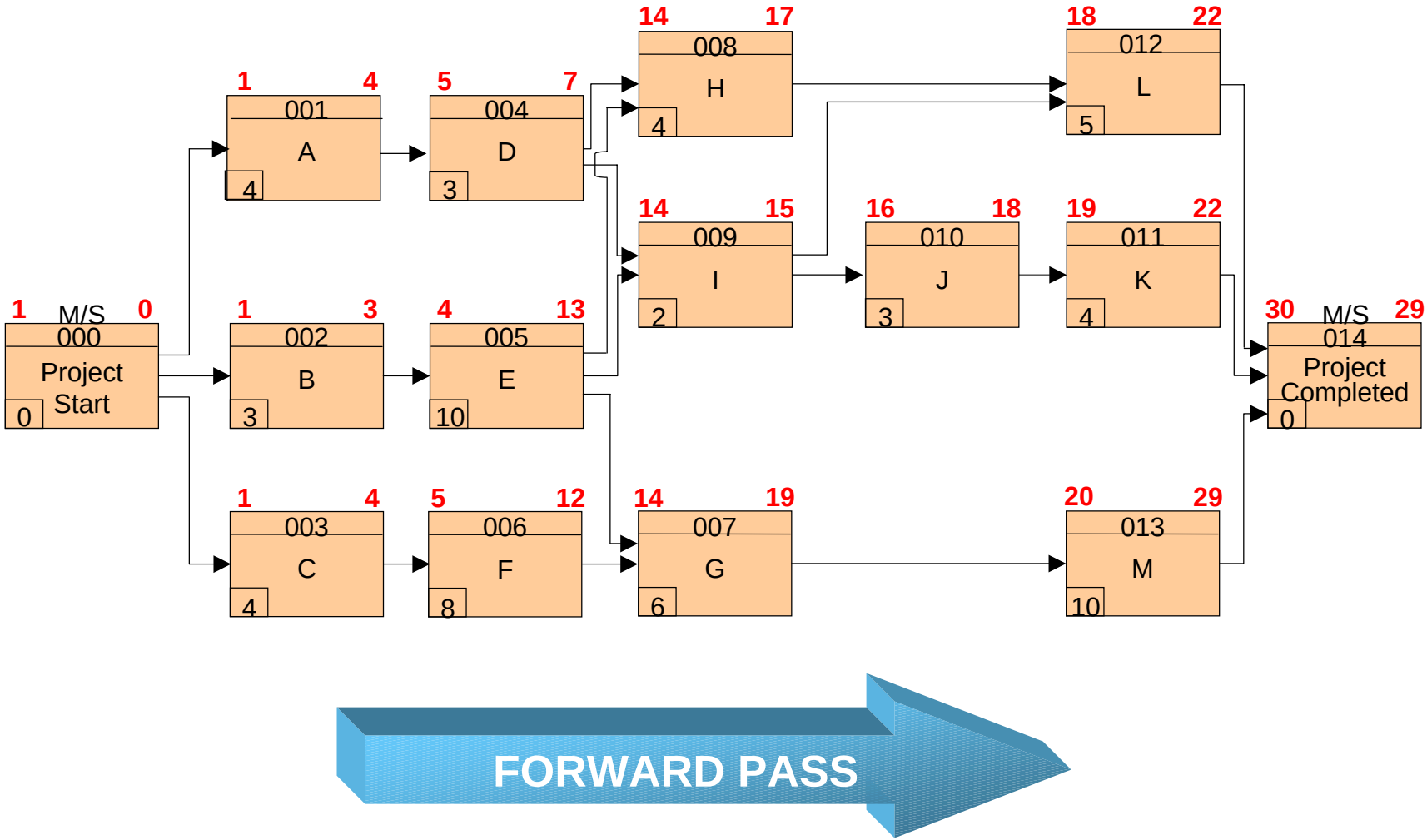
Forward Pass



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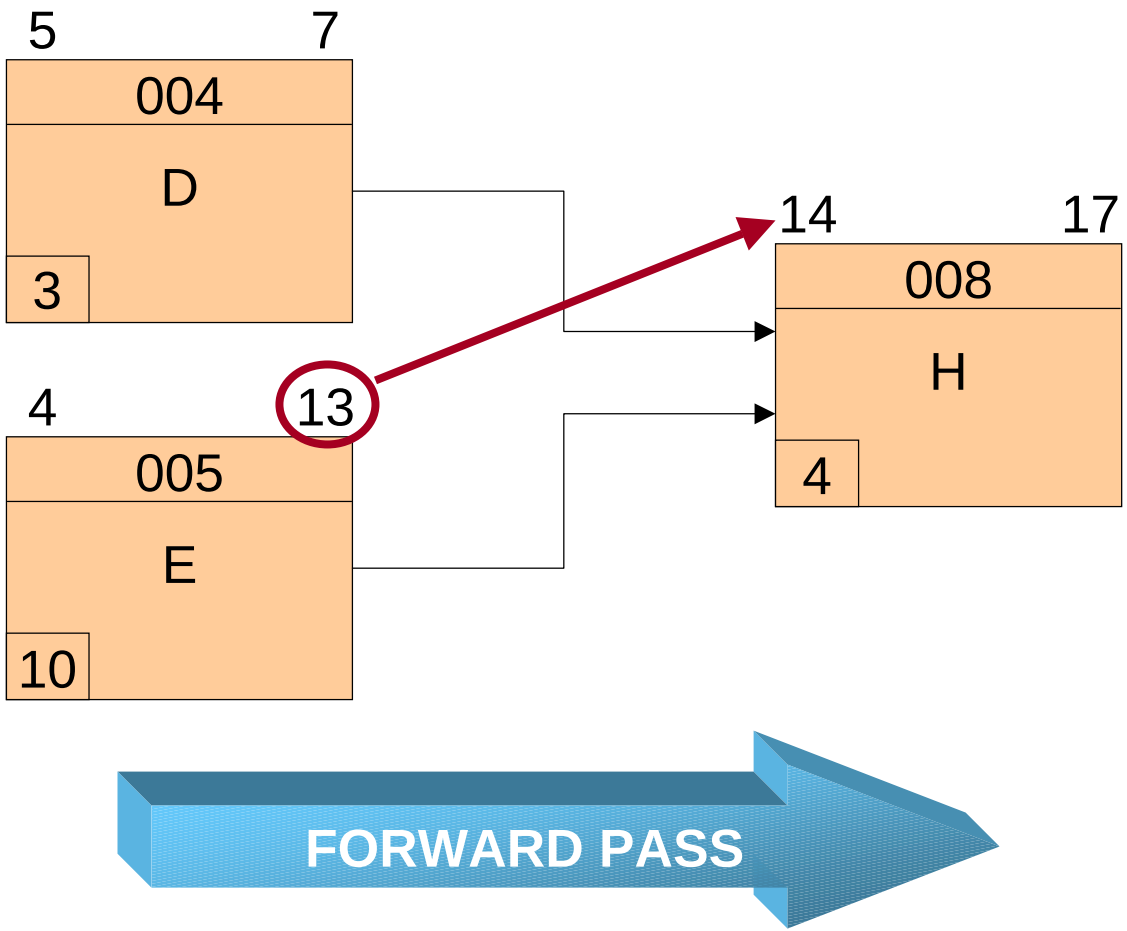
Multiple Paths



- Always take the “latest” date (or largest number)

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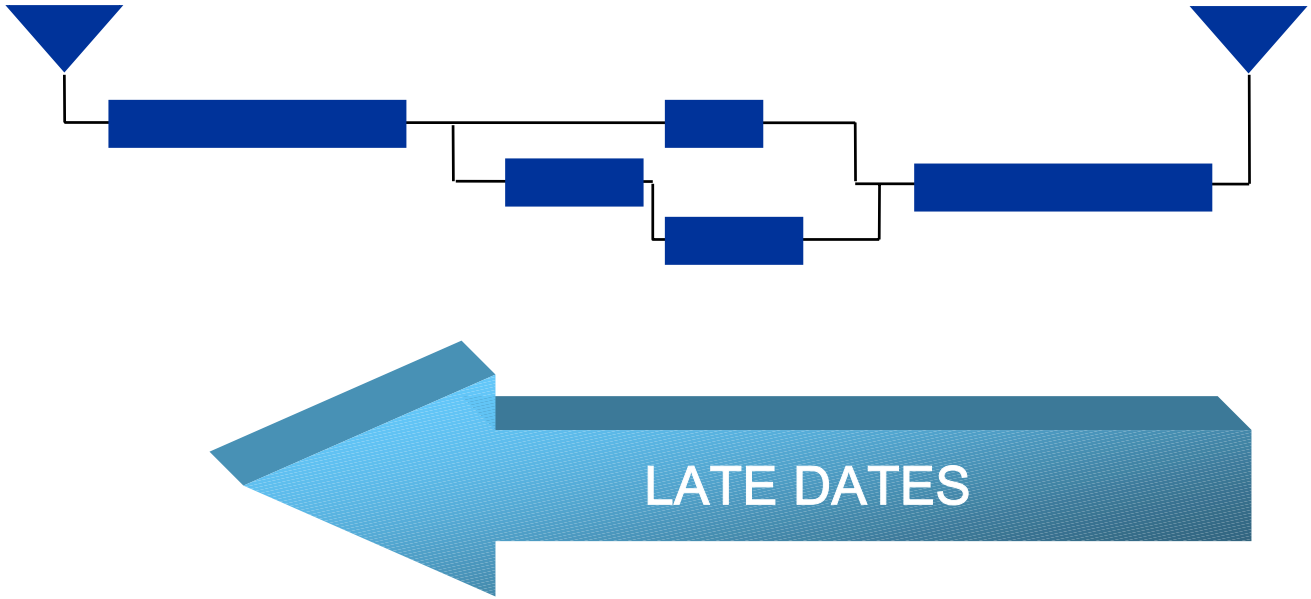
Backward Pass

- Working backward from project finish to start, calculate the latest that each task must start and finish in order to meet the end date.



- Yields when the project must start to meet the latest acceptable completion date.

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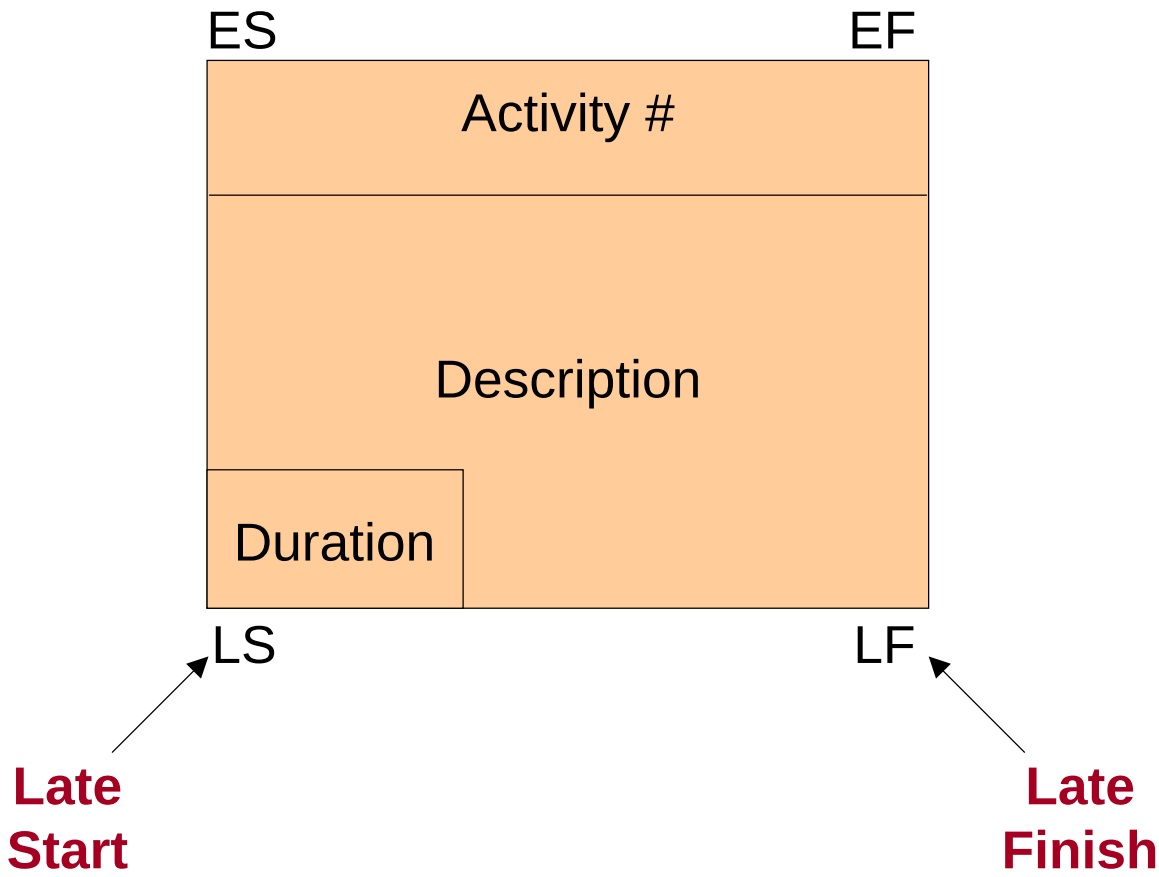

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Backward Pass

- LS = LF – Duration +1
- Given “No Lag,” LF (preceding activity) = LS (succeeding activity) – 1

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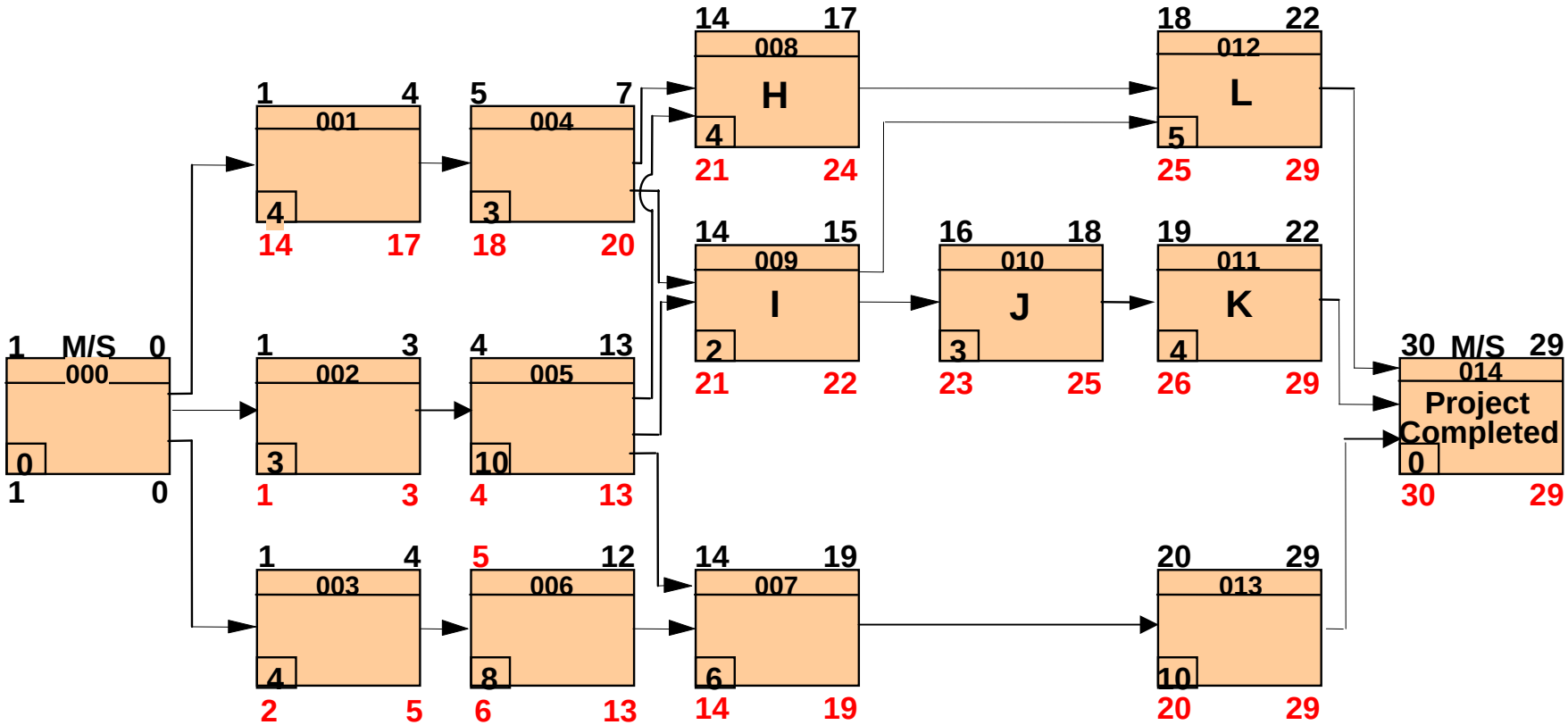
Network A



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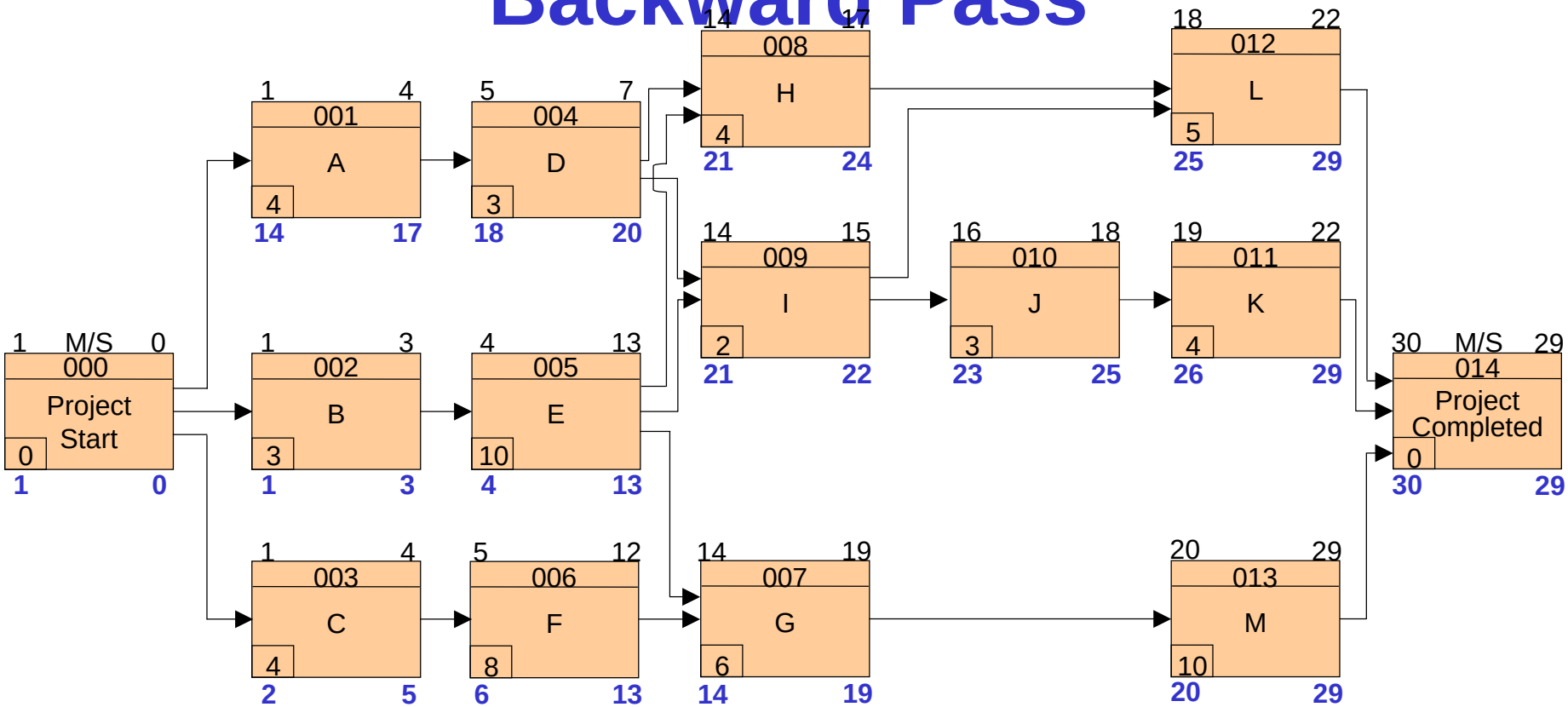
Backward Pass



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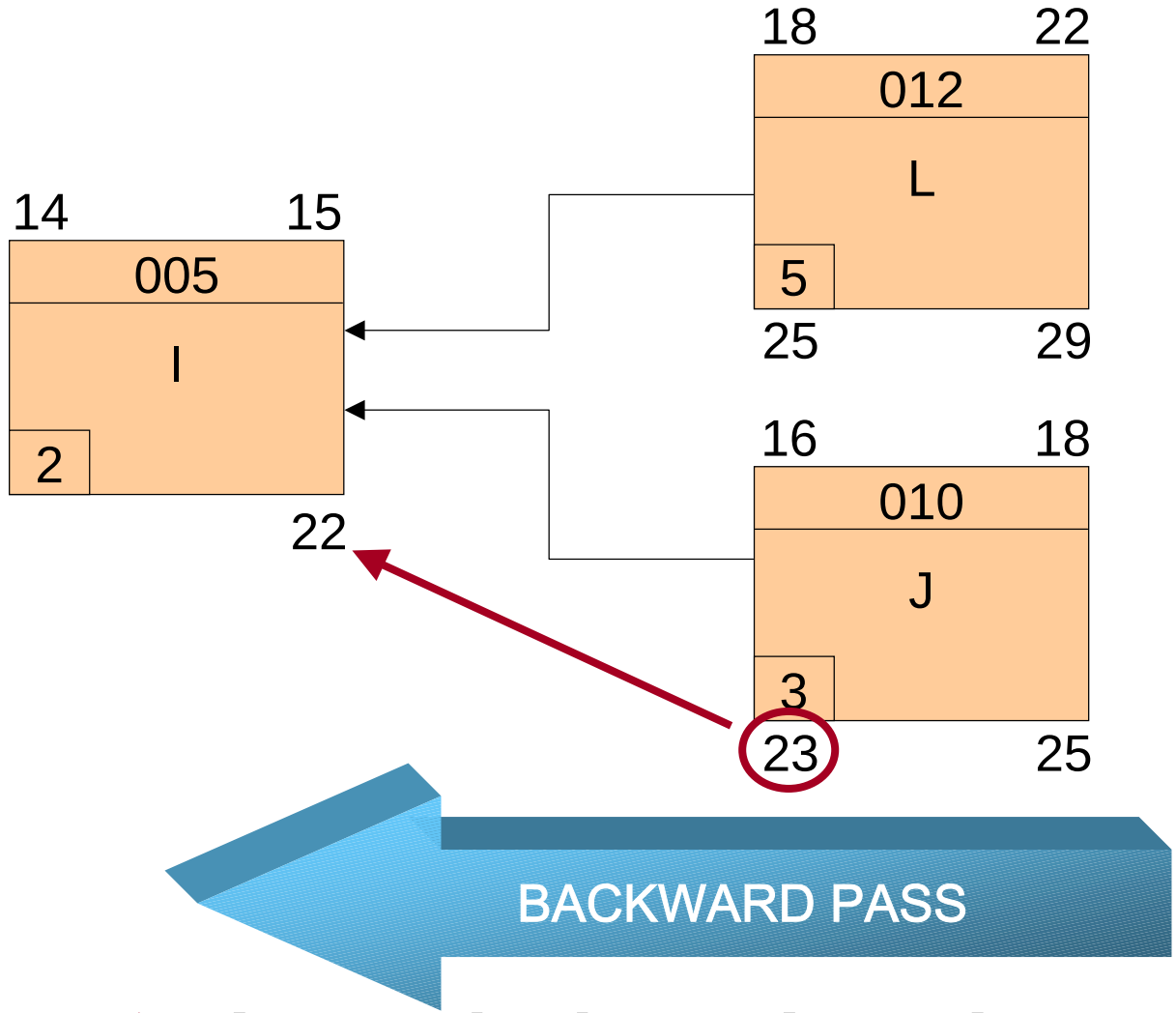
Multiple Paths



- Always take the “earliest” date (or smallest number)

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Why Calculate The Network?

- Establish ES & EF dates and project duration
- Calculate LF & LS dates based on project completion
- Defines “Float”

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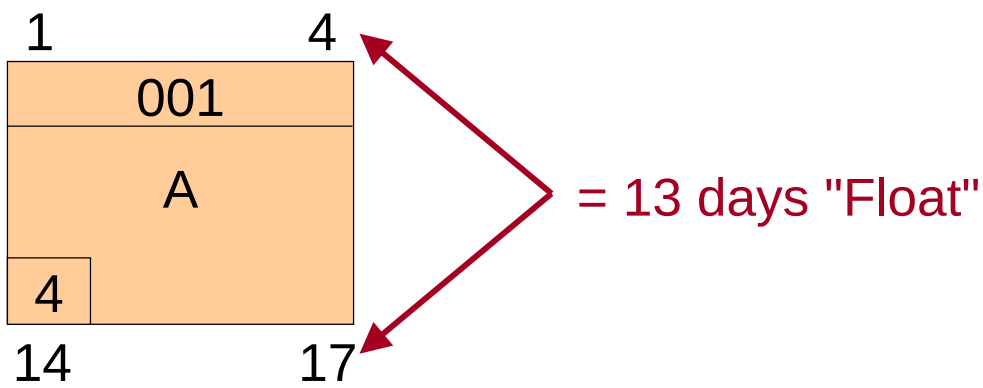
Total Float (Leeway Or Slack)

- Amount of time an activity can be delayed before it impacts Project Completion
- Calculated by comparing LF to EF



- Also called Path/Shared Float

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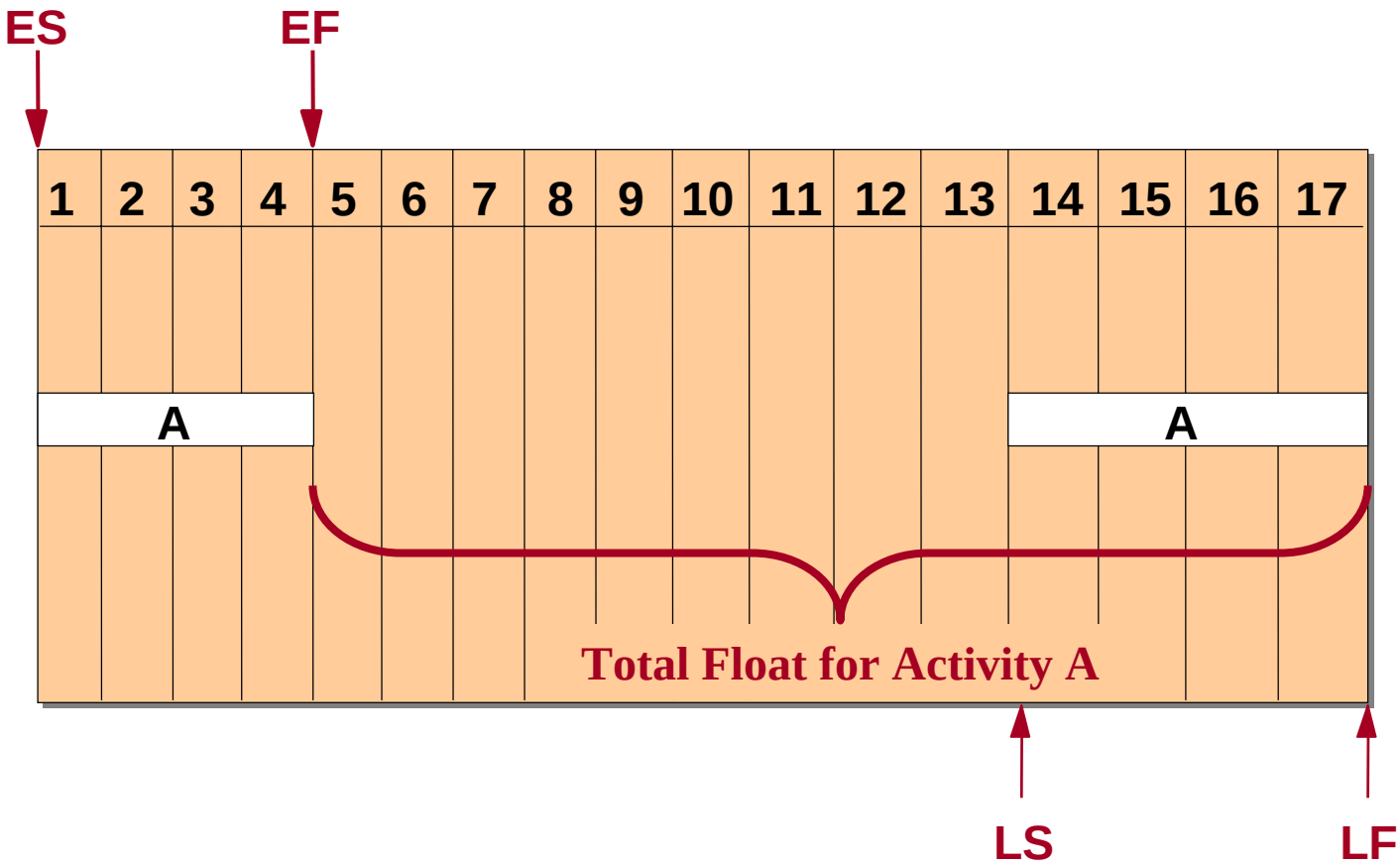
Total Float



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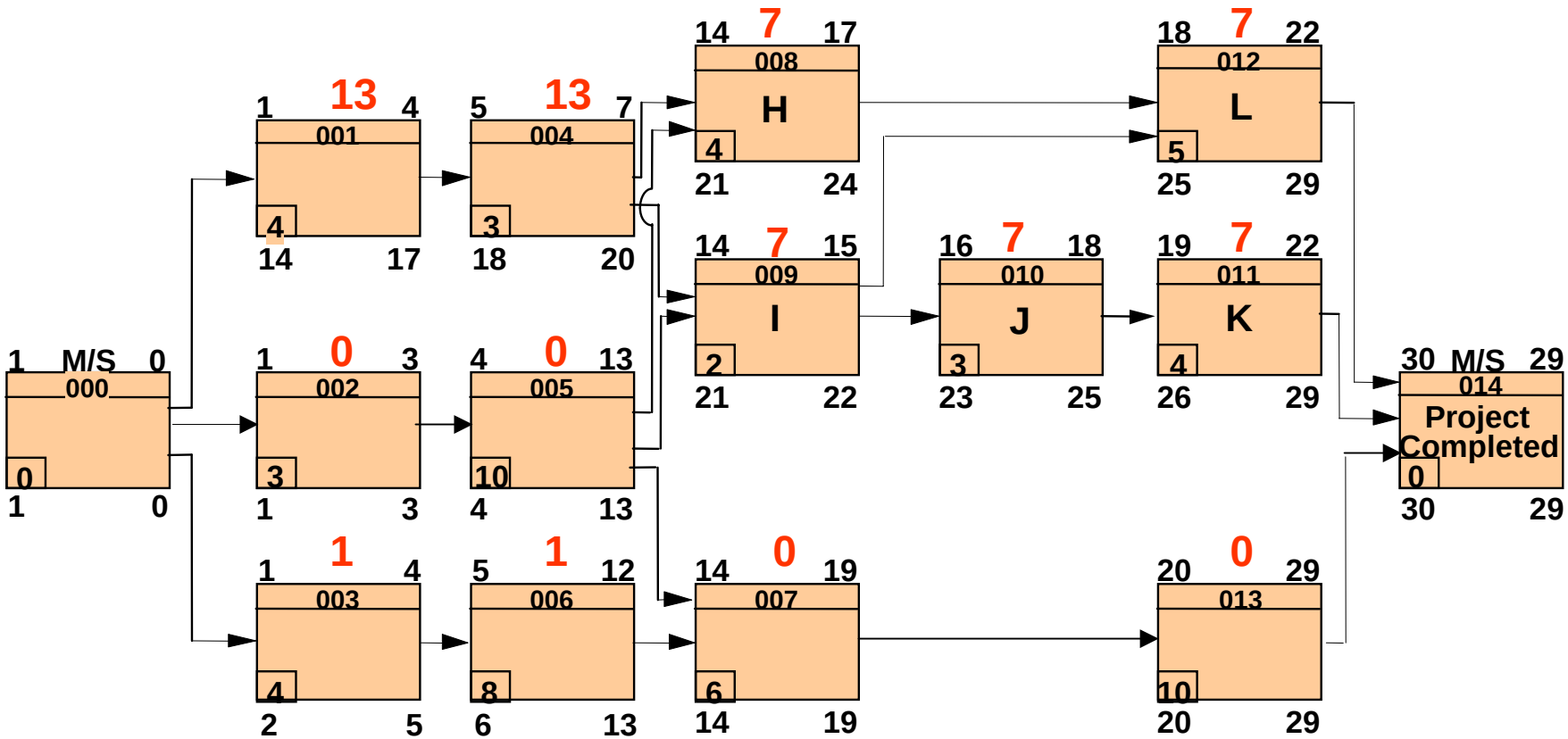
Network A Total Float



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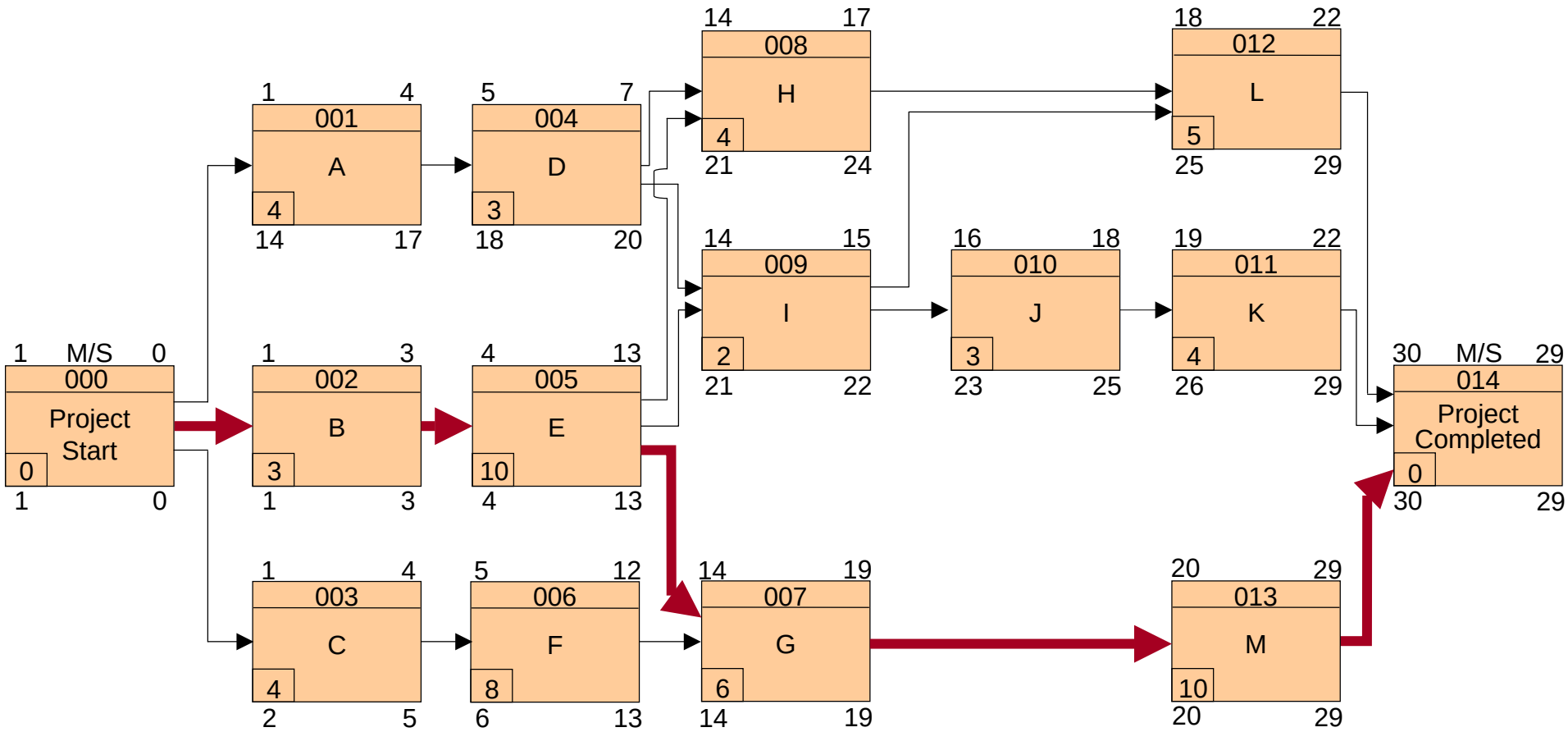
Network A



Critical Path

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Critical Path

- Longest path of logically related activities through the network which has the “least” Total Float.
- Defines project duration.
- Network A Path:

B E G M

3 + 10 + 6 + 10 = 29 days

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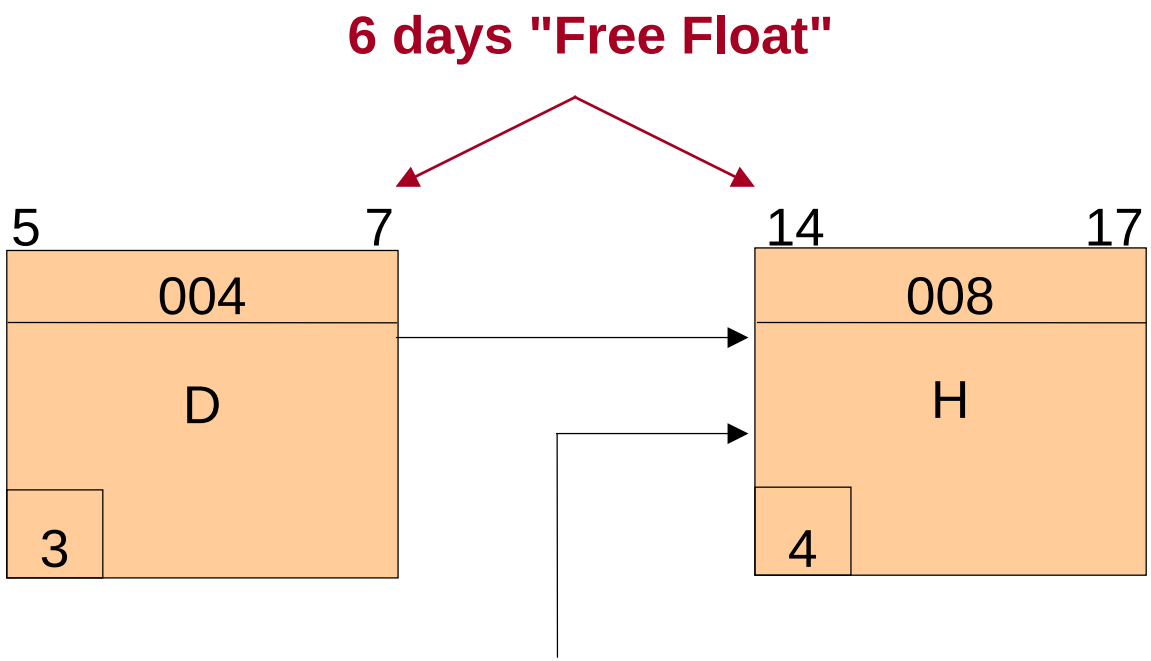
Activity (Free) Float

- Amount of time an activity can be delayed before it impacts any succeeding activity



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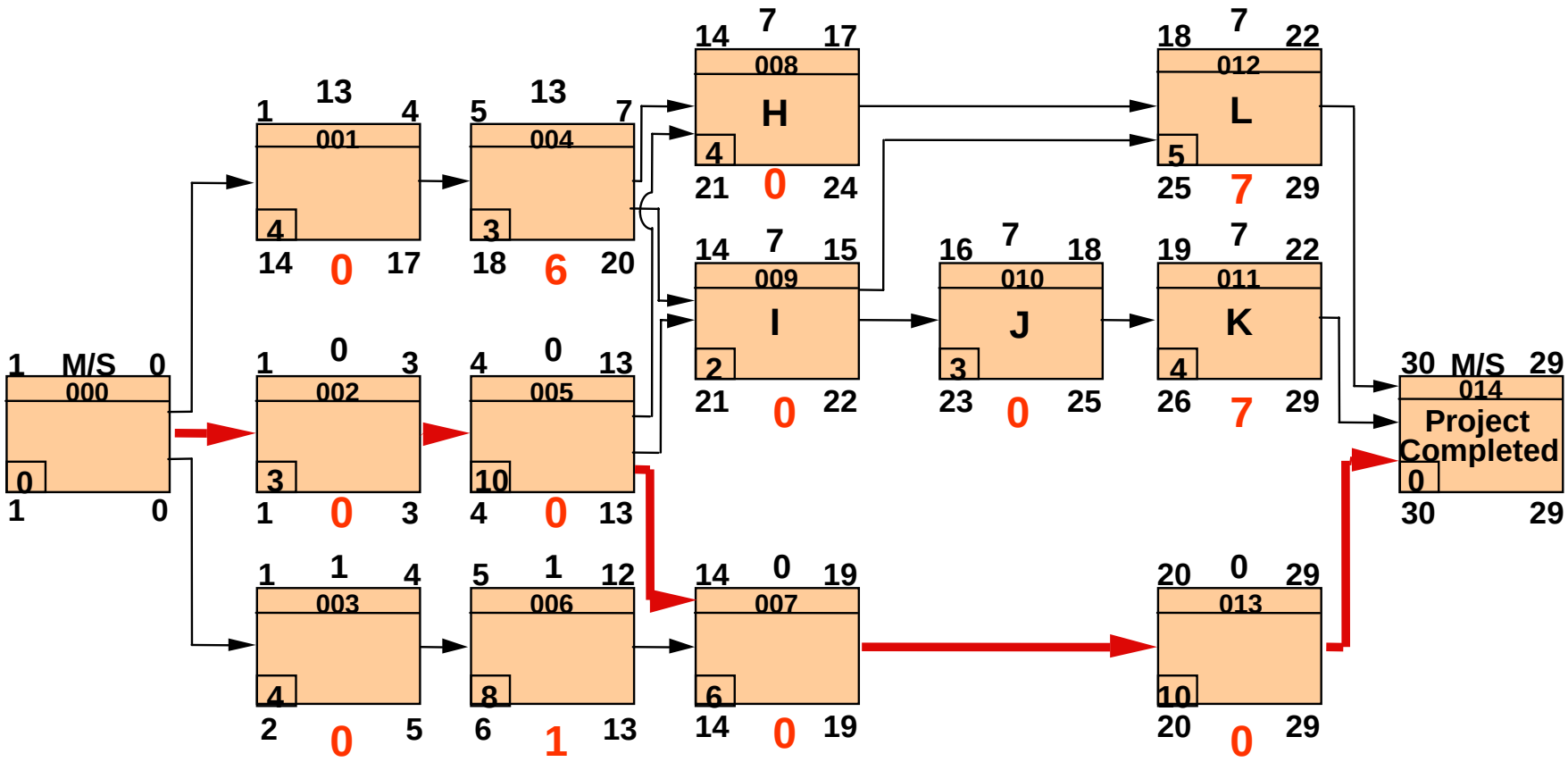
NETWORK A FREE FLOAT



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Planning/Scheduling Process

PLANNING (Think)

Defines the activities involved in the project, their logical sequence, and their interrelationship.

SCHEDULING (Do it)

Places the project and each of its activities in a workable timetable.

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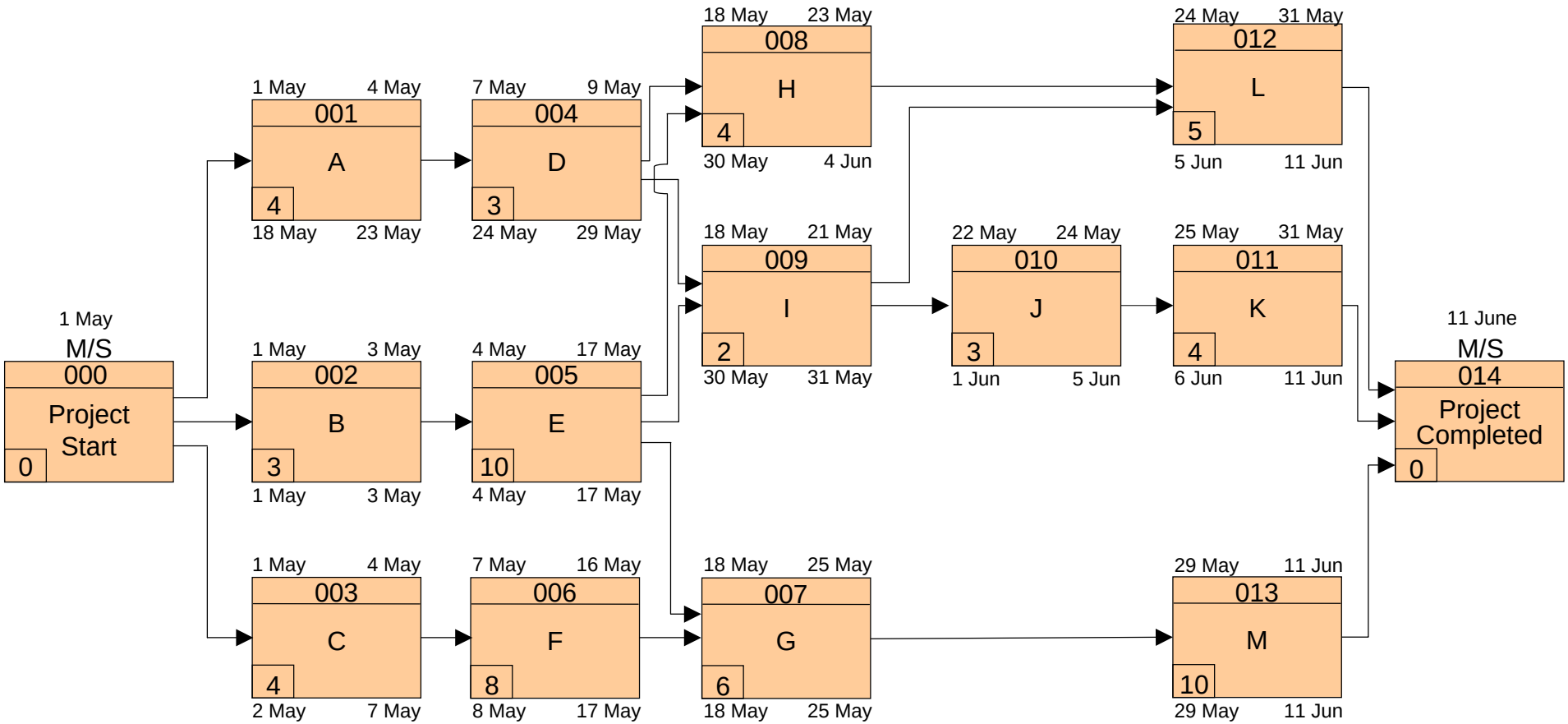
With Calendar Applied



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Thank you.

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